

Claims

1. A breeder poultry feed diet composition for poultry breeder operations, the poultry feed diet composition comprising a balanced feed composition plus a citrus feed supplement, said feed supplement being a citrus byproduct generated by citrus juice expressing from citrus fruit, said citrus feed supplement including citrus byproduct particles, and said citrus feed supplement being at a concentration of not more than about 2 weight percent, based on the total weight of the poultry feed diet composition, said poultry feed diet composition being adapted for enhancing poultry breeder operations.
2. The breeder poultry feed diet composition in accordance with claim 1, wherein said citrus feed supplement is at a concentration of not greater than about 1.5 weight percent, based on the total weight of the poultry feed diet composition.
3. The breeder poultry feed diet composition in accordance with claim 1, wherein said citrus feed supplement is at a concentration of at least about 0.2 weight percent and up to about 1 weight percent, based upon the total weight of the poultry feed diet composition.
4. The breeder poultry feed diet composition in accordance with claim 1, wherein said citrus feed supplement is at a concentration of not greater than about 32 pounds per ton of feed diet composition.
5. The breeder poultry feed diet composition in accordance with claim 1, wherein said citrus feed supplement is at a

concentration of not greater than about 24 pounds per ton of feed diet composition.

6. The breeder poultry feed diet composition in accordance with claim 1, wherein said citrus feed supplement is at a concentration of at least about 4 pounds and up to about 16 pounds per ton of feed diet composition.
7. The breeder poultry feed diet composition in accordance with claim 1, wherein said citrus byproduct has a moisture content of between about 5 and about 12 percent by weight, based upon the total weight of the citrus byproduct.
8. The breeder poultry feed diet composition in accordance with claim 1, wherein said citrus feed supplement citrus particles comprise dried citrus byproduct flake.
9. The breeder poultry feed diet composition in accordance with claim 1, wherein said citrus feed supplement citrus particles comprise pelletized dried citrus byproduct.
10. The breeder poultry feed diet composition in accordance with claim 1, wherein said citrus particles are selected from the group consisting of a citrus peel, citrus pulp, citrus flavedo, citrus albedo, citrus rag, and combinations thereof.
11. The breeder poultry feed diet composition in accordance with claim 1, wherein said citrus byproduct of the citrus feed supplement is a dried and limed byproduct which had been ground to a particle size of about 2mm or less to provide said citrus particles.

12. The breeder poultry feed diet composition in accordance with claim 1, wherein said citrus feed supplement includes a combination of by product components, each in its native state as present in dried citrus byproduct from juice extraction equipment.
13. The breeder poultry feed diet composition in accordance with claim 12, wherein said byproduct components include:
(a) pectin, demethylated pectin, and combinations thereof; (b) a food grade citrus-originating acid; (c) hesperidin, other flavonoids, and combinations thereof; (d) one or more limonin glucosides, other bioflavonoids, and combinations thereof; and (e) sinensetin, tangeretin, nobiletin, other polymethoxylated flavones, and combinations thereof.
14. The breeder poultry feed diet composition in accordance with claim 13, wherein said citrus byproduct (c) component is a flavonoid selected from the group consisting of naringin, naringenin, narirutin, hesperidin, hesperetin and combinations thereof.
15. The breeder poultry diet feed composition in accordance with claim 13, wherein said citrus byproduct (d) component is a bioflavonoid selected from the group consisting of limonin, nomolin, a limonin glucoside, d-limonene, and combinations thereof.
16. The breeder poultry feed diet composition in accordance with claim 13, wherein said citrus byproduct components further include a material selected from the group consisting of ascorbic acid, a carotenoid, beta-carotene, beta-cryptoxanthin, lycopene, xanthophyll, and combinations thereof.

17. The breeder poultry diet feed composition in accordance with claim 13, wherein said citrus byproduct components further include tocopherol.
18. The breeder poultry diet feed composition in accordance with claim 12, wherein said citrus byproduct components include pectin, demethylated pectin, citric acid, folic acid, ascorbic acid, a carotenoid, beta-carotene, beta-cryptoxanthin, lycopene, xanthophyll, naringin, naringenin, narirutin, hesperidin, hesperetin, sinensetin, tangeretin, nobiletin, alpha-tocopherol, limonin, nomolin, a limonin glucoside, and d-limonene.
19. The breeder poultry diet feed composition in accordance with claim 12, wherein said citrus byproduct components include a pectin, a food grade acid, ascorbic acid, a carotenoid, a citrus originating flavonoid, a citrus originating polymethoxylated flavone, and a tocopherol.
20. A process for enhancing commercial poultry breeder operations, comprising:
 - supplying a space having an area at which poultry breeders are fed;
 - providing a breeder poultry feed diet composition which comprises a balanced feed composition and a citrus feed supplement, said citrus feed supplement being a citrus byproduct generated by expressing citrus juice from citrus fruit, the citrus byproduct containing citrus peel and pulp, said citrus feed supplement being at a concentration of not more than about 2 weight percent, based on the total weight of the poultry feed diet composition; and
 - placing said breeder poultry feed diet composition within the area at which poultry breeders are fed,

thereby having the poultry feed on the breeder poultry feed diet.

21. The process in accordance with claim 20, wherein said citrus feed supplement is at a concentration of not greater than about 1.5 weight percent, based on the total weight of the poultry feed diet composition.
22. The process in accordance with claim 20, wherein said citrus feed supplement is at a concentration of at least about 0.2 weight percent and up to about 1 weight percent, based upon the total weight of the poultry feed diet composition.
23. The process in accordance with claim 20, wherein said citrus feed supplement is at a concentration of at least about 4 pounds and up to about 16 pounds per ton of feed diet composition.
24. The process in accordance with claim 20, wherein said citrus byproduct has a moisture content of between about 5 and about 12 percent by weight, based upon the total weight of the citrus byproduct.
25. The process in accordance with claim 20, wherein said citrus feed supplement comprises particles of dried citrus byproduct flake.
26. The process in accordance with claim 20, wherein said citrus feed supplement comprises particles of pelletized dried citrus byproduct.
27. The process in accordance with claim 20, wherein said citrus byproduct contains citrus waste selected from the

group consisting of citrus peel, citrus pulp, citrus flavedo, citrus albedo, citrus rag, and combinations thereof.

28. The process in accordance with claim 20, wherein said citrus byproduct of the citrus feed supplement is a dried and limed byproduct which had been ground to a particle size of about 2mm or less to provide said citrus particles.
29. The process in accordance with claim 20, wherein said citrus feed supplement includes a combination of byproduct components, each in its native state as present in dried citrus byproduct from juice extraction equipment.
30. The process in accordance with claim 29, wherein said byproduct components include: (a) pectin, demethylated pectin, and combinations thereof; (b) a food grade citrus-originating acid; (c) hesperidin, other flavonoids, and combinations thereof; (d) one or more limonin glucosides other bioflavonoids and combinations thereof; and (e) sinensetin, tangeretin, nobiletin, other polymethoxylated flavones, and combinations thereof.
31. The process in accordance with claim 20, wherein said providing of the breeder poultry feed diet composition is carried out in at least two stages including a first stage during which the poultry is fed for a length of time adequate for the poultry to grow to pullet size and a second stage during which female poultry lay eggs at least some of which are fertilized for hatching into poultry chicks.

32. The process according to claim 20, wherein the providing of said citrus feed supplement places citrus byproduct into the poultry feed diet without purifying the citrus byproduct present in the citrus feed supplement.
33. The process according to claim 20 wherein the providing of said citrus feed supplement places citrus byproduct into the poultry feed diet without extracting the citrus byproduct present in the citrus feed supplement.